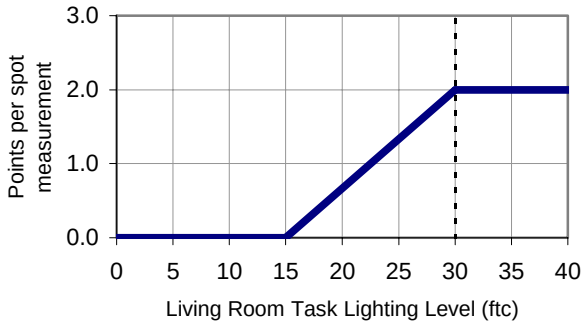
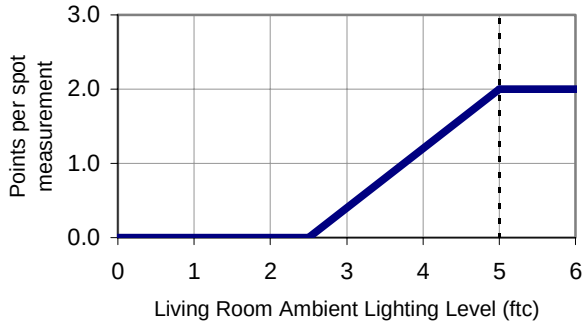
Contest 8: Lighting

Electric Lighting Quantity (20 pts):

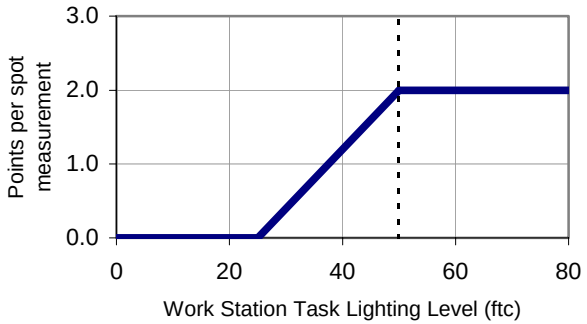
On one evening near the beginning of the Contest Week, after the sun has set, the Contest Officials will take measurements of lighting levels in each room of a team's house. As illustrated in the figures below, full points are awarded at or above the desired lighting level, and no points are awarded below the minimum lighting level. Points for lighting levels between the minimum and desired levels are scaled linearly. All measurements are in units of footcandles (ftc). Light-emitting devices cannot be within 18 in. (45.7 cm) of the sensors. Contest Officials will photograph the lighting system configuration used in this Contest to ensure that the same configuration is used in the Electric Lighting Quality contest.



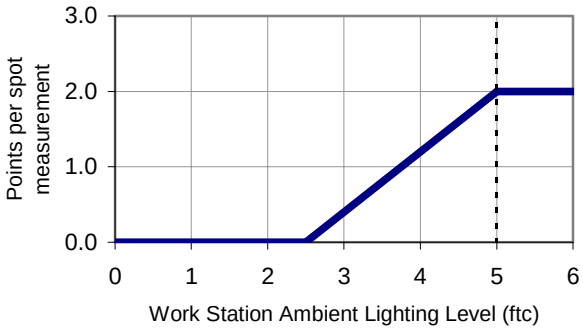
Maximum points per spot measurement:				2.0 points	
Full Points:		Light Level	≥	30 ftc	(323 lux)
Reduced Points:	15 ftc (161 lux) <	Light Level	<	30 ftc	(323 lux)
No Points:		Light Level	≤	15 ftc	(161 lux)



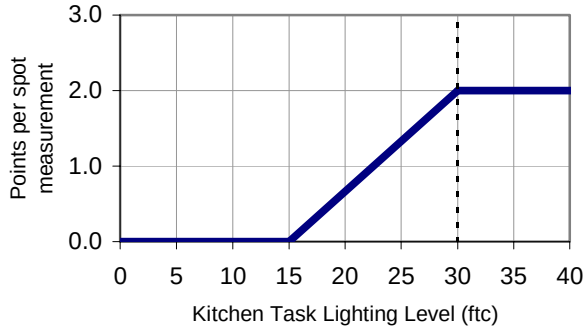
Maximum points per spot measurement:				2.0 points	
Full Points:		Light Level	≥	5 ftc	(54 lux)
Reduced Points:	2.5 ftc (27 lux) <	Light Level	<	5 ftc	(54 lux)
No Points:		Light Level	≤	2.5 ftc	(27 lux)



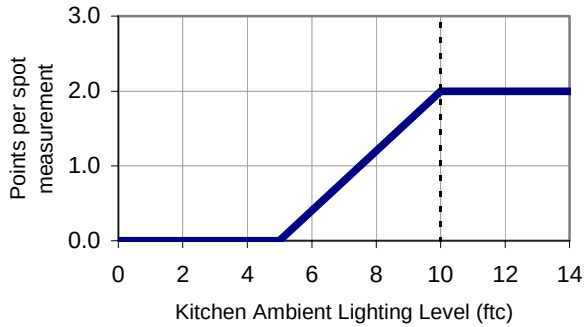
Maximum points per spot measurement:					2.0	points
Full Points:			Light Level	≥	50 ftc	(538 lux)
Reduced Points:	25 ftc	(269 lux) <	Light Level	<	50 ftc	(538 lux)
No Points:			Light Level	≤	25 ftc	(269 lux)



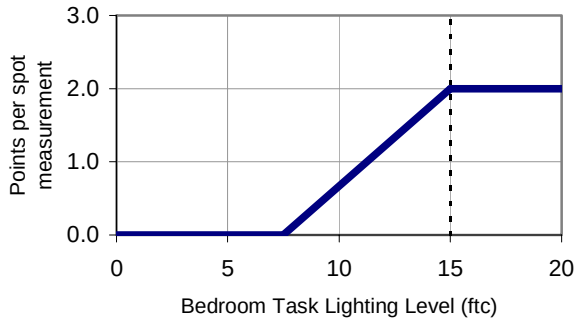
Maximum points per spot measurement:					2.0	points
Full Points:			Light Level	≥	5 ftc	(54 lux)
Reduced Points:	2.5 ftc	(27 lux) <	Light Level	<	5 ftc	(54 lux)
No Points:			Light Level	≤	3 ftc	(27 lux)



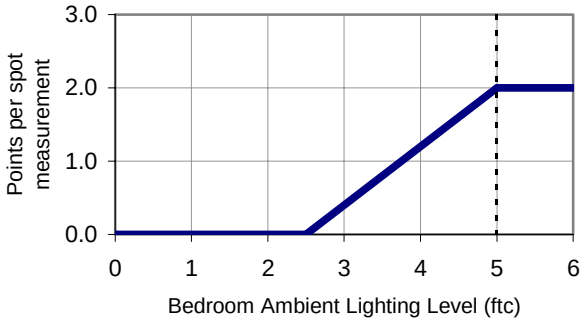
Maximum points per spot measurement:					2.0	points
Full Points:			Light Level	≥	30 ftc	(323 lux)
Reduced Points:	15 ftc	(161 lux) <	Light Level	<	30 ftc	(323 lux)
No Points:			Light Level	≤	15 ftc	(161 lux)



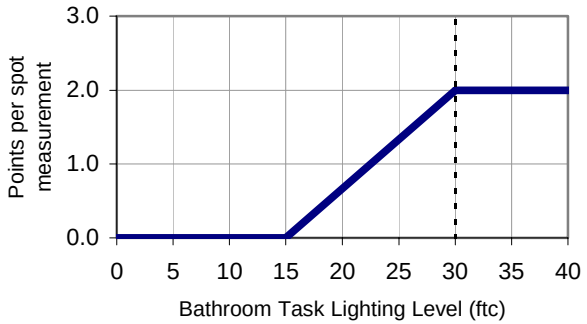
Maximum points per spot measurement:					2.0 points	
Full Points:			Light Level	≥	10 ftc	(108 lux)
Reduced Points:	5 ftc	(54 lux) <	Light Level	<	10 ftc	(108 lux)
No Points:			Light Level	≤	5 ftc	(54 lux)



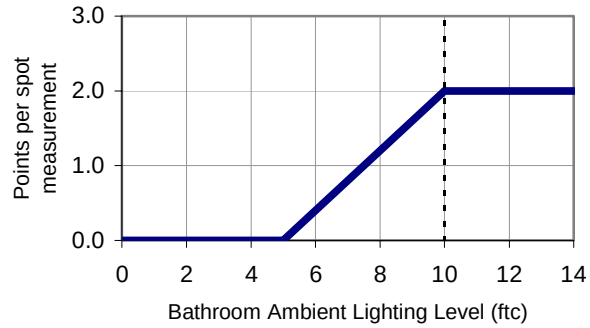
Maximum points per spot measurement:					2.0 points	
Full Points:			Light Level	≥	15 ftc	(161 lux)
Reduced Points:	7.5 ftc	(81 lux) <	Light Level	<	15 ftc	(161 lux)
No Points:			Light Level	≤	8 ftc	(81 lux)



Maximum points per spot measurement:					2.0 points	
Full Points:			Light Level	≥	5 ftc	(54 lux)
Reduced Points:	2.5 ftc	(27 lux) <	Light Level	<	5 ftc	(54 lux)
No Points:			Light Level	≤	3 ftc	(27 lux)



Maximum points per spot measurement:					2.0 points	
Full Points:			Light Level	≥	30 ftc	(323 lux)
Reduced Points:	15 ftc	(161 lux) <	Light Level	<	30 ftc	(323 lux)
No Points:			Light Level	≤	15 ftc	(161 lux)

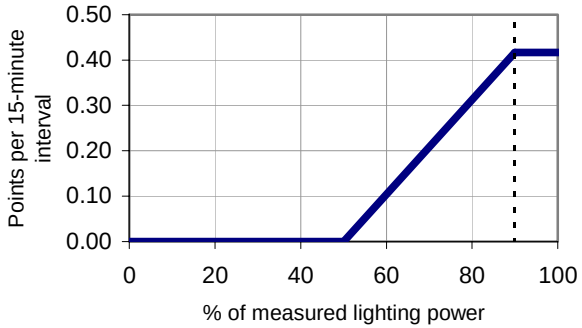


Maximum points per spot measurement:					2.0 points	
Full Points:			Light Level	≥	10 ftc	(108 lux)
Reduced Points:	5 ftc	(54 lux) <	Light Level	<	10 ftc	(108 lux)
No Points:			Light Level	≤	5 ftc	(54 lux)

Standard Usage Patterns (15 pts):

Points are available 4 days of the Contest Week for providing interior lighting in the evening. The task and ambient light levels measured in the electric lighting quantity Contest Activity must be maintained from 7:30 p.m. to 9:45 p.m. The organizers will use power measurements, not light level measurements, to ensure that this lighting schedule is met. During the electric lighting quantity Contest Activity, the total power consumed by all the lamps in use to attempt to meet or exceed the required light levels will be measured. During the hours specified above, teams could earn points every 15 minutes for consuming all or most of the power consumed during the electric lighting Quantity Contest Activity according to the following graph.

Note: The electric lighting system must be located on a dedicated circuit(s) to make this power measurement possible. If the lighting system is not located on a dedicated circuit(s), no points will be awarded for this Contest Activity.



Maximum points per 15-minute interval:				0.4167	points
Full Points:		% measured	≥	90	%
Reduced Points:	50 % <	% measured	<	90	%
No Points:		% measured	≤	50	%

Exterior Lighting (5 pts):

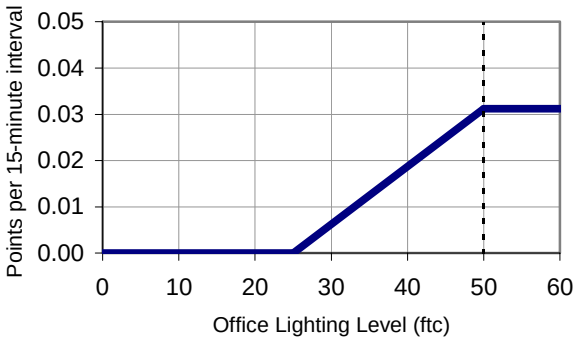
Points will be awarded for providing appropriate exterior lighting according to the following requirements:

- The exterior house number light must be on from 8 p.m. to 6 a.m. of the following day. Contest Officials will perform periodic spot checks throughout the night to verify that the house number is illuminated, and 0.625 points will be awarded for each of 4 nights of the Contest Week that a house passes all the spot checks. If a house fails at least one spot check, no points will be awarded for that night.
- The exterior door lights must be energized from 8 p.m. to 6 a.m. of the following day. Contest Officials will perform periodic spot checks throughout the night to verify that either the lights are on continuously, or that they turn on when a motion sensor is tripped; 0.625 points will be awarded for each of 4 nights of the Contest Week that a house passes all the spot checks. If a house fails at least one spot check, no points will be awarded for that night.

Integration of Electric and Natural Lighting (5 pts):

Before the Contest Week begins, photometers (light level sensors) will be installed on the surface of the home office desk. Light-emitting devices within 18 in. (45.7 cm) of the sensors are not permitted.

Teams can earn a maximum of 0.0313 points per 15-minute interval by keeping the time-averaged office work surface light level above 50 footcandles (538 lux) between 9 a.m. and 5 p.m. for 4 days of the Contest Week. A reduced point value is added to the team's score for every 15-minute interval the time-averaged office work surface light level is between 25.0 footcandles (269 lux) and 50.0 footcandles (538 lux). Reduced point values are scaled linearly, as shown in the following graph.



Maximum points per 15-minute interval:					0.0313 points			
Full Points:				Light Level	≥	50 ftc	(538 lux)
Reduced Points:	25 ftc	(269 lux)	<	Light Level	<	50 ftc	(538 lux)
No Points:				Light Level	≤	25 ftc	(269 lux)

Electric Lighting Quality (40 pts):

Lighting plays a significant role in the appearance and style of a home. In addition to producing the light needed to enjoy a home, lighting can create a "mood" and create highlights that feature aspects of the architecture and interior design. Very often the quality of the lighting, including both the lighting fixtures and their effect on the space, can dramatically enhance an overall feeling of quality and value.

The obvious challenge of lighting design in a solar home is to achieve these qualities using energy-efficient technologies and low-wattage light sources. In addition, providing controls that reduce the use of lighting or reduce power through dimming can save energy as well as add to the convenience of the lighting and to the ambiance it creates.

Judging the lighting quality will be conducted by a Panel of Judges consisting of professional lighting designers, interior designers, or architects (or all three), who will award points in each of the following categories:

- Appropriateness: The lighting design provides lighting that is appropriate for the space, in general according to genre and location.
- Style: The design uses luminaires that are consistent with the overall architecture and interior design in shape, form, material, finish, and other qualities.
- Performance: In addition to meeting light level requirements, the lighting produces desirable effects (such as emphasizing work areas, artwork, or architectural features), creates dramatic appearance or great ambiance (especially in the living areas of the room), and adds artistic design or flair (or all three).
- Color: The design makes proper use of color temperature (CCT) and color rendering (CRI) in each space.
- Controls: The design provides switching or dimming that is accessible to users and permits or enhances the use of lighting.

Daylighting Quality (15 pts):

Simply providing daylighting for interior spaces is not enough. If there is too much daylight, or daylight is introduced incorrectly into the space, overheating and glare can result and impede or prevent the enjoyment of interior spaces and the work that must be done in them. In this Contest Activity, designs will be evaluated subjectively for the qualities of the daylighting system(s) employed in the home. A Panel of Judges consisting of professional lighting designers, interior designers, or architects (or all three) will award points based on the following criteria.

- The Panel of Judges will evaluate the ability of the daylighting design to provide adequate interior illumination throughout most of the day under most seasonal and daily weather conditions. This includes the amount, type, and orientation of glazing and the use of shading devices to control glare or heat gain (or both).
- The Panel of Judges will evaluate the appearance and integration of the daylighting system into the architectural design of the home.

Contest Activity	**Points Available**
Electric Lighting Quantity	20
Standard Usage Patterns	15
Exterior Lighting	5
Integration of Electric and Natural Lighting	5
Electric Lighting Quality	40
Daylighting Quality	15
TOTAL	**100**